

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

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Property Management
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NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year)

15-09-2004

Applicant's or agent's file reference
021320 WO

IMPORTANT NOTIFICATION

International application No.
PCT/FI2003/000465

International filing date (day/month/year)
12-06-2003

Priority date (day/month/year)
05-07-2002

Applicant
Outokumpu Oyj
et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see Also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Rec'd PCT/PTC
REC'D 21 SEP 2004

30 DEC 2004

WIPO

PCT

Applicant's or agent's file reference 021320 WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI 2003/000465	International filing date (day/month/year) 12.06.2003	Priority date (day/month/year) 05.07.2002
International Patent Classification (IPC) or national classification and IPC F27D 3/00		
Applicant Outokumpu Oyj et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

Date of submission of the demand 10.12.2003	Date of completion of this report 30.08.2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Mårten Hulthén/ELY Telephone No. +46 8 782 25 00

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI 2003/000465

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☐ the international application as originally filed/furnished
- ☒ the description:

pages 1 - 6 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

- ☒ the claims:
- pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 8 - 10 received by this Authority on 30.06.2004

pages* _____ received by this Authority on _____

- ☒ the drawings:
- pages 1 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI 2003/000465

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-18</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-18</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-18</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Amended claims 1-18 were filed on 30 June 2004.

Documents considered being of particular relevance:
D1 US 5685892

The object of the invention is to feed anode scrap into a smelting reactor in a manner that the anodes do not cause damage to the reactor linings. The anodes are bent to a certain radius of curvature, so that when they are fed they meet the metal surface in an essentially horizontal position.

D1 (column 5, lines 24-32; column 8, lines 6-12) discloses that anodes are bent prior to being fed to a smelting furnace in order to prevent impingement directly upon the furnace bottom. However, D1 does not show or indicate in any way that the anodes are bent to a certain radius of curvature as stated in claims 1 and 14 of the application. Consequently, the invention as claimed is novel.

The stated difference implies improvements in reducing the damage to the lining of a furnace when charging anodes. The centre of gravity for the anodes is shifted which affects the dropping behaviour in a favourable way. Therefore, the invention as defined by claims 1-18 is considered to involve an inventive step and also to fulfil the criteria of industrial applicability.

CLAIMS

1. An arrangement for feeding an anode into a metallurgical smelting reactor (2), such as a flash converter, said arrangement including a feeding funnel (7) made of at least one part for feeding at least one anode (4) at a time into the smelting reactor, said arrangement also including a bending element (5) for bending the anode, **characterized** in that the essentially completely bent anode (4) is arranged to meet the surface of the melt (8) contained in the smelting reactor in an essentially horizontal position and the radius of curvature of an anode bent in the bending element (5) is essentially 1,000 – 3,000 millimeters.
2. An arrangement according to claim 1, **characterized** in that the feeding funnel (7) is arranged in the immediate vicinity of the reaction shaft of the smelting reactor (2).
3. An arrangement according to claim 1 or 2, **characterized** in that the feeding funnel (7) is made of two parts, a top part (9) and a bottom part (10), so that the angle of inclination of the top part with respect to the horizontal level is larger than that of the bottom part.
4. An arrangement according to claim 3, **characterized** in that the angle A between the top part (8) and the bottom part (10) of the feeding funnel (7) is essentially 10 – 30 degrees.
5. An arrangement according to claim 1 or 2, **characterized** in that the feeding funnel (7) is provided with a trajectory-shifting element in order to alter the trajectory of the anode.
6. An arrangement according to claim 3, 4 or 5, **characterized** in that the distance between the bottom part (10) of the feeding funnel (7) and the surface of the melt (8) contained in the reactor is advantageously 0.8 – 1.3 meters.

7. An arrangement according to claim 1, **characterized** in that the bending element (5) for bending the anode consists of four rolling rollers (6) that are located above the feeding funnel (7).

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8. An arrangement according to claim 7, **characterized** in that the diameter of the rolling roller (6) is 100 – 500 millimeters.

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9. An arrangement according to any of the preceding claims, **characterized** in that the anodes (4) are arranged to drop into the smelting reactor (2) one by one.

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10. An arrangement according to claim 1, 2, 3, 4, 5, 6, 7, 8 or 9, **characterized** in that the anodes (4) are arranged to drop into the smelting reactor (2) in batches of several anodes.

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11. An arrangement according to any of the preceding claims, **characterized** in that the anode (4) is arranged to drop into the smelting reactor (2) so that the anode grip brackets, i.e. lugs (15) are pointed upwards.

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12. An arrangement according to any of the preceding claims, **characterized** in that in connection with the feeding funnel (7), there are provided at least two shutter elements (12, 14) for preventing the furnace atmosphere from leaking to the surroundings.

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13. An arrangement according to any of the preceding claims, **characterized** in that the feeding funnel (7) is provided with elements for guiding the sliding direction of the anode (4).

14. A method for feeding an anode into a metallurgical smelting reactor (2), such as a flash converter, so that at least one anode (4) is fed at a time through a feeding funnel (7) made of at least one part into the smelting reactor, which anode is also bent by means of a bending element (5),

5 **characterized** in that the anode (4) is bent essentially completely, and that it meets the surface of the melt (8) contained in the smelting reactor at an essentially horizontal position and in the bending element (5), the anode is bent so that the obtained radius of curvature for the anode is essentially 1,000-3,000 millimeters.

10 15.A method according to claim 15, **characterized** in that the bending element (5) is made of four rolling rollers (6) with a diameter of 100 – 500 millimeters.

16.A method according to claim 15, 16 or 17, **characterized** in that the anodes (4) are dropped into the smelting reactor (2) one by one.

15 17.A method according to claim 15, 16 or 17, **characterized** in that the anodes (4) are dropped into the smelting reactor (2) in batches of several anodes.

20 18.A method according to claim 15, 16, 17, 18 or 19, **characterized** in that the anode (4) drops into the smelting reactor (2) so that the anode grip brackets, i.e. lugs (15) are pointed upwards.